

EXHIBIT F

DRAFT AIR SAMPLING/MONITORING AND CONTINGENCY PLAN

This exhibit describes the air monitoring program and contingency plan that may be implemented on the former Unocal Seattle Marketing Terminal property located on the 3100 block of Elliott Avenue in Seattle, Washington. Exhibit F was prepared on behalf of the Trust for Public Land (TPL) and the Seattle Art Museum (SAM). TPL and SAM intend to enter into a Prospective Purchaser Consent Decree with the Washington State Department of Ecology (Ecology) pursuant to the MTCA, RCW 70.105D.040(5). SAM is the proposed successor in interest to a purchase and sale agreement between Unocal and TPL for the purchase of Unocal's former Seattle Marketing Terminal (Terminal) property.

The following sections outline the potential scopes of work for ambient and indoor air monitoring which will be performed at the site.

1.0 SHORT-TERM AMBIENT AIR SAMPLING PROGRAM

We propose to perform one round of ambient air monitoring in the Fall of 1999 during weather conditions which are favorable for soil vapor emissions. Vapor emissions of volatile organic compounds (VOCs) are impacted by weather conditions as follows:

- Higher temperature increases volatilization of VOCs from soil and groundwater;
- Lower barometric pressure increases vapor migration;
- Lower moisture content in soil increases the air-filled porosity and diffusion of VOCs; and
- Lower wind speed reduces dispersion in ambient air.

Therefore, optimum weather conditions for sampling ambient air in the Fall occurs when a low pressure system rolls through Puget Sound before the heavy rains saturate soils.

The ambient air monitoring sampling event will likely be completed in mid- to late October on a day where wind speeds are minimal and a low pressure system is present. Three 8-hour composite air samples will be collected using SUMMA canisters in the Upper and Lower Yards and the Off-Site Area (total of nine samples). Proposed sampling locations are shown on Figure 1. Three upwind 8-hour composite air samples will also be collected to establish area background conditions. Potential upwind background sampling locations are shown on Figure 1. Note that locations are placed to account for prevailing wind direction at time of sampling.

Samples will be submitted for analysis of petroleum hydrocarbons using EPA Method TO-14A. Additional analysis using a Gas Chromatography (GC) method may be necessary to quantify specific petroleum fractions. The analyte list is presented in Table 1.

Compliance with the ambient air remedial action objective will be determined as follows:

- Upper and Lower Yard and Off-Site Area ambient air concentrations must meet MTCA Method B cleanup levels; or
- Upper and Lower Yard and Off-Site Area ambient air concentrations must be below or equal to area background concentrations.

Results of this monitoring event will be summarized in a technical memorandum. Based on these results, the scope of a long-term air monitoring program will be developed. The schedule for this work is presented in greater detail in Exhibit E (Schedule).

2.0 DEVELOPMENT OF LONG-TERM AMBIENT AIR MONITORING PROGRAM

The objective of the long-term monitoring program is to verify that the soil to ambient air pathway is not of concern. This program will be designed to collect ambient air samples under reasonable “worst-case” conditions including:

- **Warm Weather Conditions.** One round of sampling will be performed during the 2000 and 2001 summer seasons (total of two sampling events). Sampling will be conducted on warm dry days exhibiting low wind speeds.
- **Low Pressure Conditions.** One round of sampling will be performed in the late Summer or early Fall of 2000 before heavy rains decrease the air-filled porosity in site soils. Sampling will be collected on a day where wind speeds are minimal and a low pressure system is present.

The results of the initial short-term sampling event conducted in the Fall of 1999 will be used to establish the optimal sampling locations for long-term monitoring. It is anticipated that the number of sampling locations in the Upper and Lower Yards and the Off-Site Area will be reduced to one location at each site (total of three samples). The draft long-term ambient air monitoring plan will be submitted for Ecology review within 90 days after completing the short-term ambient air monitoring field program. Ecology will endeavor to review and comment on the draft monitoring plan within 45 days. Within 30 days after receiving final Ecology comments and approval letter, the long-term ambient air monitoring plan will be finalized. The Ecology-approved plan will include a schedule for conducting the long-term ambient air monitoring field program and reporting.

Ambient air samples will be sampled and analyzed using the same procedures described previously for the short-term monitoring program. The proposed sampling and analytical methods will be discussed in greater detail in the long-term ambient air compliance monitoring plan.

Following completion of the three sampling events, a technical memorandum will be produced and submitted for Ecology's review within 90 days after completing long-term ambient air monitoring. The technical memorandum will present recommendations regarding the need for additional air monitoring or remedial actions. If ambient air concentrations exceed both the Method B and area background criteria during the long-term monitoring program, engineering controls could be implemented in the affected areas as discussed in the Contingency Plan section. It is important that any decisions regarding the need for remedial actions be made prior to site development. If results indicate that the soil to ambient air pathway does not appear to be of concern, the long-term monitoring program may be discontinued. Within 45 days of receipt, Ecology will review the technical memorandum and will issue a written determination as to whether contingency remedial actions are necessary to address ambient air.

3.0 INDOOR AIR MONITORING PROGRAM

If permanent heated buildings with closed basements or first floors are planned for the site, soil vapor investigations will be performed along the proposed footprints of the buildings to determine if engineering controls are needed. As part of the geotechnical exploration program, additional characterization of the subsurface soil vapors will be performed to determine the need for a vapor control system. Within 90 days after the building location is selected and design is finalized, an indoor air sampling and analysis plan will be submitted to Ecology for their review and approval. The sampling and analysis plan will be finalized within 45 days after receiving final Ecology comments and approval letter. Sampling will be conducted in accordance with the schedule included in the Ecology-approved plan.

If field soil headspace screening results indicate the presence of organic vapors at levels exceeding background conditions, a decision will be made to either add engineering controls or perform additional vapor monitoring to determine if petroleum and BTEX vapor concentrations exceed MTCA Method A or B indoor air cleanup criteria. If petroleum hydrocarbon vapor concentrations exceed MTCA indoor air criteria, engineering controls will be incorporated in the building design. An indoor air impact assessment report summarizing the results of the sampling program will be submitted to Ecology for review and approval within 90 days after completing the sampling program.

Within 45 days of receipt, Ecology will review the indoor air impact assessment report and will issue a written determination as to whether contingency remedial actions are

necessary to address indoor air. If contingency remedial actions are deemed necessary, SAM will issue an indoor air engineering control design report for Ecology review as discussed in Section 5.2.

4.0 GROUNDWATER MONITORING

Unocal continues to perform groundwater monitoring pursuant to the Order. No additional groundwater monitoring will be performed as part of this CAP.

5.0 CONTINGENCY PLAN

5.1 Ambient Air

If ambient air data are not in compliance with the Method B and area background criteria during the long-term monitoring program, engineering controls would be implemented in the affected areas. A draft remedial design report will be submitted for Ecology review within 180 days after site development plans are finalized. Ecology will endeavor to review and comment on the remedial design report within 45 days of receipt. Within 60 days after receiving final Ecology comments and approval letter, the remedial design report will be finalized. The report will be subject to a 30-day public comment period. Ecology will prepare a Responsiveness Summary and any necessary revisions will be made to the remedial design report. The approved remedial actions will be completed in accordance with the schedule included in the final remedial design report.

For the Lower Yard, these engineering controls would include installing vapor collection systems consisting of perforated piping within a granular material placed beneath the caps. If ambient air quality within the Upper Yard is not in compliance, vapor extraction wells will be placed along its western boundary to control vapor emissions originating beneath Elliott Avenue. The type of vapor collection systems utilized in the Off-Site Area to address non-compliance will depend on whether the site is redeveloped and if the existing cap is maintained.

5.1.1 Lower Yard

The proposed vapor collection system would likely consist of a 1-foot-thick layer of granular material placed under the cap. Perforated pipes would be placed through the granular layer and connected to one or more blowers. The blower(s) would create a vacuum in the pipes and granular layer, extracting any accumulating vapors. Because of the large size of the Lower Yard and expected high air leakage from the surface, one or more large capacity blower(s) would likely be required to create a vacuum under the entire yard. Sizing of the blower(s) and piping system would be performed as part of remedial design documents to be submitted to Ecology.

Depending on the compounds extracted and their concentrations, a vapor control system may or may not be required by the Puget Sound Clean Air Authority. If required, it could consist of granulated activated carbon units, a biofilter, or a catalytic oxidizer. The blower(s) and emissions control unit would be placed in one or more fenced and locked area(s) within the park.

5.1.2 Upper Yard and Elliott Avenue

Any ambient air impacts detected in the Upper Yard would have originated from its western boundary (in the vicinity of MW-61A) or from Elliott Avenue. Therefore, the most efficient way of capturing these vapors would be to collect them at the source by installing a vapor extraction system along the western boundary of the Upper Yard or under the Elliott Avenue sidewalk. The system could consist of a trench with perforated pipes connected to a blower, placed under the sidewalk or under the proposed reduced permeability cap in the Upper Yard. As long as the vacuum created in the trench induces more vapor migration than the gradient of diffusion between the source and surface, the vapors will not migrate past the trench.

Alternatively, extraction wells could be installed to extract vapors at greater depth, closer to the source, potentially reducing air leakage from the surface and reducing the blower size required. Depending on the compounds extracted and their concentrations, a vapor control system may or may not be required by the Puget Sound Clean Air Authority. If required, it could consist of granulated activated carbon units, a biofilter, or a catalytic oxidizer. The blower and emissions control unit would be placed in a fenced and locked area within the park. Construction details of the vapor extraction system will be provided as part of remedial design documents to be submitted to Ecology.

5.1.3 Off-Site Area

The type of engineering controls used to control vapor emissions in the Off-Site Area will depend on whether the area is redeveloped. If the site is not redeveloped and/or the existing pavement cap is maintained, any ambient air issues must be addressed as part of on-going Unocal efforts under the Order.

If site redevelopment involves removing all or most of the existing pavement, a vapor collection system consisting of a 1-foot-thick layer of granular material will likely be placed under the replacement cap. Perforated pipes would be placed through the granular layer and connected to one or more blowers. Sizing of the blower(s) and piping system would be performed as part of remedial design documents to be submitted to Ecology.

An ambient air compliance monitoring plan will be developed and submitted for Ecology review within 60 days after the remedial design report is approved. Ecology will endeavor

to review and comment on the draft monitoring plan within 30 days. Within 30 days after receiving final Ecology comments and approval letter, the ambient air compliance monitoring plan will be finalized. The Ecology-approved plan will include a schedule for conducting the ambient air compliance monitoring.

5.2 Indoor Air

Within 60 days after Ecology issues a written determination that contingency remedial actions are necessary to address indoor air, a draft indoor air engineering control design report will be submitted for Ecology review. Ecology will endeavor to review and comment on the engineering control design report within 45 days of receipt. Within 60 days after receiving final Ecology comments and approval letter, the engineering control design report will be finalized. The approved engineering controls will be implemented at time of building construction.

Engineering controls will be incorporated in the building design, and may include design features such as a garage open to the outdoors, a heating and air conditioning system which pressurizes the building instead of creating a vacuum, the placement of a geomembrane under the slab acting as a vapor barrier, or the installation of a vapor collection and extraction system under the slab. Figure 2 depicts a conceptual vapor removal system, consisting of perforated pipes in a grid pattern with a vacuum pump system to remove collecting vapors. Depending on the concentration of hydrocarbon present, the vapors may be treated before being released to the atmosphere. Water entering the system drainage layer will move by gravity feed to the storm sewer system. Vapors would reside at the top of the piping and will be removed by the vacuum pump.

An indoor air compliance monitoring plan will be developed and submitted for Ecology review within 60 days after the engineering control design is approved. Ecology will endeavor to review and comment on the draft monitoring plan within 30 days. Within 30 days after receiving final Ecology comments and approval letter, the indoor air compliance monitoring plan will be finalized. The Ecology-approved plan will include a schedule for conducting the indoor air compliance monitoring.

7018\Exhibit_F(rpt).doc

CONTENTS	<u>Page</u>
1.0 SHORT-TERM AMBIENT AIR SAMPLING PROGRAM	1
2.0 DEVELOPMENT OF LONG-TERM AMBIENT AIR MONITORING PROGRAM	2
3.0 INDOOR AIR MONITORING PROGRAM	3
4.0 GROUNDWATER MONITORING	4
5.0 CONTINGENCY PLAN	4
5.1 <i>Ambient Air</i>	4
5.2 <i>Indoor Air</i>	6

TABLE

1	Analyte List for Ambient Air Monitoring	7
---	---	---

FIGURES

1	Ambient Air Monitoring Location Plan
2	Optional Vapor Removal System for Subgrade Structure, Upper Yard